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Valuing the Information and Communication Technologies in Education. Collaborative Tools

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Abstract

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The collaborative approach has become a vital component in many fields, its benefits being visible even in education. In this context, in order to come to the aid of the educational activities, we are witnessing today an explosion of tools and technologies that we can use to support didactic projects based on collaborative learning. The actual context and changes require every teacher to have a clear and detailed image of the available software tools and on how they can be used most effectively in order to achieve the specific instructive-educational objectives. Moreover, the continuous development of IT makes the focus to move slowly towards collaborative tools developed for mobile systems. The software tools are used in education today mainly for creating and transposing teaching content or for processing and making accessible the existing ones. From the education system perspective, the educational purpose is that these new information and communication technologies to be accessed and used by pupils or students on a large scale and to generate genuine learning by facilitating reception, understanding and assimilation of scientific content.

Keywords: Education system; collaborative tools; collaborative learning; transposing teaching content.

1 Introduction – issues and methodology of the study

The current concerns of educational institutions are aimed at ensuring the quality of education and are increasingly targeted towards identifying new opportunities, means or instruments suitable to optimize the training activities of professional skills of the pupils or students. In this sense, for education, *Information and Communication Technologies* (ICT) plays an increasingly important role; it is used to create educational content or conversion of regular educational materials, in order to be accessed by students in a simple, interactive and effective manner from learning perspective.

The educational system is constantly under pressure of striving to adapt to the changes generated by the ICT innovations and breakthroughs. The constant adaptation of digital tools in the education systems is a priority and a strategic direction in all countries of the world and especially at the European level. The EU documents and literature of speciality in the field presents the assumed and generally-valid orientation as a target for 2020 Europe concerning digital competitiveness and strengthening of European digital economy, which spreads out in all economic sectors and is an integrant part of social life. In Europe, 50% of productivity growth in recent years is due to ICT. Nevertheless, Europe must maintain this accelerated pace if it wishes to fully exploit the potential benefits of the digital economy, improving students' competences and supporting innovation in ITC.

The actual educational context requires every teacher or trainer to develop their digital skills and use software tools available in the classroom. This context is absolutely necessary to generate a positive impact in terms of achieving the objectives of educational specific to the field, by using ICT tools. This tools have the power to facilitate the acceptance, understanding, assimilation and creative application of specific contents.

Technology is everywhere in the knowledge society and therefore its transfer in education is justified. More, education is affected by actual technologies, which have undoubtedly influenced teaching and learning. In this context, there is an increasing interest on using actual information technologies to improve education.

Studies in the domain show that in education, the trend is one of innovation. This trend requires adopting mainly collaborative technologies, increasingly available on the devices, which provide real opportunities in terms of running with improved efficiency the educational processes. This development is sustained by the digital skills of pupils and students, more skilful in handling mobile devices and continuously connected to a wide range of applications.

Implementing of actual information technologies is regarded as one of the most important issues. From this reason, the impact of ICT at global level has generated a reaction in educational systems.

Developing digital competences is a priority as pointed out in the Strategic Framework ET2020 and in Joint Report on its implementation from 2015. Thus, the issues addressed in the present study concerning the use of ITC in education, involved the delimitation in conducting research and the identification of future research directions, attempting to answer to the following questions:

- ✓ What is the current context on adopting ITC technologies in education?
- ✓ Which are the challenges faced by teachers when implementing ITC technologies into the teaching and learning process?

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- ✓ Which are the proper digital tools for the educational process?

The answers provided for the above-mentioned questions are based on the research conducted, whose purpose was twofold: it involved a qualitative analysis through the literature review and an analysis on the level of ITC integration in education. The research thus enabled the identification of new approaches and digital challenges as well as its effects showed in:

- ✓ specific ways of integrating ITC in education, especially the collaborative ones;
- ✓ teachers' reaction to adapting the teaching content through ITC tools;
- ✓ personal/institutional barriers to the large scale adoption of ITC.

In this context, this paper provides a review of the most important opportunities and challenges associated with the adoption of current information technology in education, some benefits and possible disadvantages of this process being noted.

2 Actual Context of Adoption ICTS in Education – Literature Review

Information technologies evolve rapidly. The current generation has grown up with technology and is different from previous generations. They easily handle devices in their everyday life and want to use them in an active way, in their education training through the development of digital competences. Moreover, learning through ICT has a positive impact on communication skills, on collaboration and on learning responsibilities.

ICT is a generic term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. ICTs are often spoken of in a particular context, such as ICTs in education, health care, or libraries (Rouse, 2005).

The continued expansion of the IT field makes the focus to shift towards collaborative tools and towards the ones developed for mobile devices. In this context, to support professional training activities for pupils and students, many tools and digital technologies may be used, that have the potential to stimulate learning.

In *The impact of technological and communication innovation in the knowledge-based society* paper is shown that the importance of new technologies has become a leitmotif of the discourse on education at all levels: curriculum and didactic practice, training professors, developing education institutions, educational policies or the management of the educational system. The issue of integrating the new ICT tools in education has already been approached a long time ago, and it has been analysed from multiple perspectives, with particular emphasis on the advantages, the necessary resources and the implications estimated at various levels (Marin, 2012).

Today, the objectives in education pursue the adoption in teaching / evaluation activities (at all levels of education, including university) of collaborative technologies or software tools developed for mobile devices. This trend is due to the fact that the actual generation of students grow up with digital technology, and differ from the oldest generations. They handle technologies quickly in their day after day lives and wants to use it in their education, actively rather than passively. More than, learning with

technologies also has positive impact on learners' communication and collaboration skills, problem solving skills, responsibility for learning, and achievement (Peterson, 2010).

Technology can be an important argument for the inclusion of pupils and students with disabilities in education. The development of customizable applications tailored to users with special education needs brings many benefits as it helps modelling the learning process to different cognitive, sensorial or mobility impairments. Therefore, the design of this kind of application must take into account non-functional requirements (Fernández-Lópeza, et. al., 2013).

Schools are increasingly concerned with providing pupils and students in schools with their own computer, laptop, notebook or tablet. Moreover, in recent years, iPads and Chromebooks stood out as devices more appealing to schools.

Current information technologies determine a new approach to education. Analysis of virtual, online education leads to the conclusion that there is a new perspective to the approach of the educational process. The applicability and impact force generated by current technologies must determine their widespread adoption in the education system, benefiting also from the high degree of receptivity of young people towards them.

The attempt to bring technology closer to the pupil or student may lead to achieving the following objectives:

- ✓ to allow the teacher (through software instruments) to offer a more personalized educational content corresponding to the lessons, thus allowing the pupil or student to learn in his own rhythm and according to his personal abilities;
- ✓ to contribute to the development of modern technologies specific abilities, becoming better prepared for the modern workplace, in which digitalization is the common denominator;
- ✓ to support students and pupils in achieving some creative and more complex activities, allowing them to use instruments and online applications;
- ✓ to improve the communication process between the involved actors (teachers-pupil/student–parent).

Educational technology integration can promote the change from instructor led to student or pupil centred classrooms. Students'/pupils' achievements and skills improve when the learners are engaged, and engagement results from providing opportunities that comes with many forms of digital technologies them to take greater responsibility for their own student/pupil centred learning (Leneway, 2014).

3 Challenges that Impeding Technology Adoption in Education

Integration of modern educational technologies in education, involves the school to focus on the development of thinking, selecting: the content, methods, forms and criteria for training and evaluation. This means that it must to develop the educational technology that develops a certain style of learning with a lasting effect.

Benefits and opportunities that can be brought to actual education are the necessary prerequisites that determine IT companies in the world to target their work towards the development of some software tools for education. This development is encouraged and supported, on the one hand, by the

children's abilities to use software tools specific to smaller ages, and the openness of teachers to adapt their teaching contents to new information technologies, on the other hand. In this context, the development of new technologies in the teaching-learning domain have real implication on emergence of new didactical methodologies, within mobile learning has gained a major role.

Although the benefits are significant, there are still reluctances about teaching and assessment methods adapted to new technologies. This reluctance may be due to the inability to clearly demonstrate that the adoption of new technologies can improve learning outcomes and unequal access to technology of pupils/students from different regions of the country, thereby leading to significant gaps in the level of attainment of learning.

A described in (Kojima, 2014), teachers do not have anytime sufficient time, opportunities, and confidence to learn and practice teaching and learning technologies. Also, because of their limited time for preparing and personal preferences, teachers often skip over materials and lesson plans designed in curriculum guidance's. Even if teachers might believe in ICT as a set of tools that helps them to support more professionally and efficiently, they are likely to hesitate in integrating it into classes for a variety of reasons, which includes their lack of confidence and knowledge.

These causes can be due also to the lack of educational vision. Without a clear image of how technology can influence the current education system and how it can help improve the learning outcomes, adaptation can be an endeavour difficult to implement.

The current unprecedented development of hardware devices (computers, tablets or smart phones) as well as software ones, are challenges and concrete arguments for the full integration of information technologies in education. More, at the level of operating systems for mobile devices (Android or IOS), specific applications are becoming more numerous. In this context, we can say that the technology is capable of transforming learning by allowing the teacher to be with his pupils or students for longer periods of time.

The technology supports the teaching and learning activity because it leads learning beyond the classroom, involving all actors in the school community, prepares students for their profession. Moreover, collaborative technologies are able to generate additional benefits. For this reason, their integration (especially at higher levels of the education system) begins to be more marked and the results soon start to appear.

In Martinovic & Zhang (2012) was identified a number of challenges that Teacher Education Program (TEP) may face when designing ICT learning experiences to prepare pre-service teachers to teach with technology. Such problematic areas include:

- ✓ inadequate and/or scarce modelling of the pedagogical uses of ICT, both in schools and in the TEP;
- ✓ limited access to ICT, both in schools and in the TEP;
- ✓ misconceptions around the educational use of some ubiquitous ICT;
- ✓ insufficient comfort with ICT use among pre-service teachers;
- ✓ high and only partially fulfilled expectations that these future teachers have with reference to opportunities for learning and using ICT for teaching.

All these premises determines the education system (including the one in Romania) to adapt to information technologies, which is why projects and initiatives like "a tablet for every student in primary school" slowly become a necessary feature, specific to the education system.

4 Collaborative Tools for Education

Research on learning through collaboration and cooperation has grown in the last two decades. It has a strong theoretical and empirical support for motivational and cognitive benefits of collaboration, unlike competitive and individualistic learning activities. According to Martinovic & Zhang (2012), in the context of collaborative learning, it is expected that participants bring along their motivational beliefs, tendencies, and goals and that these will play a mediating role in their actual engagement in the group activity.

The existing digital skills of pupils and students (who spend increasingly more time on the Internet) generate significant changes in educational processes that must adapt, especially at collaborative models and online learning. These changes are due to the fact that the online medium is capable of offering important opportunities for improved collaboration. Exploitation the benefits offered by current information technologies generate improved educational activities in any educational institution. At the same time, it increases the potential for collaboration, providing the opportunity to extend students' learning environment, to complement the formal curriculum. It is also important to note that in recent years, the perception over online learning has changed; it is now seen as a more and more viable alternative to face-to-face learning.

The impact of collaborative learning requires the generation, transfer and understanding of specific knowledge, which makes collaboration a necessary and extremely valuable process. Moreover, collaborative learning can consistently contribute to personalization and enrichment of the learning experiences.

According to Syed Noor-Ul-Amin, ICTs have the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate schools experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Noor-Ul-Amin, 2013). Actual information technologies try to facilitate the educational process and help teachers to:

- ✓ create favourable contexts of learning and skills development;
- ✓ building a complex of attitudes that stimulate curiosity, the desire to know more and more, the spirit of self-competition, the pleasure of making progress and developing one's self-instructing capabilities;
- ✓ accurate reporting evaluation.

Over the last two decades, the use of technology has been an important topic in education. On the one hand, studies have shown that it can enhance teaching and learning outcomes: scholars have documented that the use of ICT can improve students' conceptual understanding, problem solving, and team working skills (Zhang & Martinovic, 2008).

In the NMC Horizon Report: 2015 Higher Education Edition, is mentioned that collective action among universities is growing in importance for the future of higher education. More and more,

institutions are joining consortia — associations of two or more organizations — to combine resources or to align themselves strategically with innovation in higher education. Today's global environment is allowing universities to unite across international borders and work toward common goals concerning technology, research, or shared values. Support behind technology-enabled learning in higher education classrooms has reinforced the trend toward open communities and university consortia, as educators and administrators recognize collective action as a sustainable method of supporting upgrades in technological infrastructure and IT services (***, 2015).

The main objective of collaborative tools is to increasing accessibility and the quality of education on a global level. Today, there is many platforms for creating, collaborating and sharing, an online environments for all our files, which offer a set of tools for students and teachers alike. For example, one of the most popular is Google Classroom, which is an online tool that allows teachers to set up classrooms, assign work to students, grade the work and return it to the students. This software tool is available to anyone with Google Apps for Education and is designed to help teachers create and collect assignments paperless, including time-saving features such as the ability to make a copy of a Google Document for each student from its classroom. There is more benefits, including:

- ✓ easy to set up,
- ✓ saves time,
- ✓ improves organization activities,
- ✓ enhances communication.

With this solution, teachers can create courses with just a few clicks.

In Addison et. al., (2010) is presented a personalized collaborative tool (Personalized Annotation Management System 2.0 – *PAMS 2.0*) useful for managing, sharing, and reusing individual and collaborative annotations as well as providing a shared mechanism for discussion about shared annotations among multiple users (students). *PAMS 2.0* can help students annotate documents and share their own annotations in collaborative learning context and coordinate and negotiate with others in face-to-face interaction and help instructors to understand student learning behaviours. According to the results of the experiments, most of students in the experimental group was satisfied with the use of *PAMS 2.0* for helping them create individual annotations and share their own annotations in collaborative learning context. The analytical results of learning achievements shown that the use of *PAMS 2.0* can increase learning achievements in collaborative learning environments and the influence of annotation on learning achievements becomes stronger with the use of the sharing mechanism.

Summarizing, we can say that in education, collaborative tools are used today to improve communication skills and to enable group problem-solving. In this way, each pupil or student can harness the knowledge of others. Also, the quality of interaction is a vital factor in the learning environments, digital tools allowing pupils or students to interact easily (ask questions and receive answers), and teachers to provide real time feedback.

5 Conclusions and Discussions

The use of ICT in education contributes to the innovation of the teaching and learning strategy, resulting in the integration and adoption of ICT specific instruments in the operation of processing

educational content in various fields. Also, it provide an education appropriate to the specific requirements of the information society, according with the technology trend, extremely dynamic and to which sometimes students are better connected than teachers. These tools enable teachers to adapt their teaching techniques, integrating ICT innovations in an interactive way and to access or create attractive digital educational content, with direct impact on young people's professional skills training. I appreciate that the benefits are already visible, and on medium and long term, the results will be reflected in an improved educational system.

Through the new ICT, a diversification of the means of access to information is generated. Development and implementation of new digital technologies generate a metamorphosis of the communication process in mass education. In this sense, it can be said that information technologies are already a major challenge of the moment in the educational training plan, the generated impact becoming a spearhead for the progress registered in all areas of social life.

The development of specialized competences is a topical issue, the curriculum directing the educational process towards achieving a quality training consonant with the knowledge society. To improve the quality of teaching, a continuous integration of new information technologies in the education system is required, in order to be applied intelligently and constructively in the development of the educational process. The benefits of technology are evident not only in the transmission and acquisition of new knowledge, but in strengthening the acquired skills and also in achieving the transfer of information between different fields of knowledge. Information technologies favour, in a very special way, the learning through discovery both in the information chapter and in terms of the variety of ways of using the computer itself, saving time and effort.

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